

The Common Core State Standards require high-level cognitive demand, such as requiring students to demonstrate deeper conceptual understanding through the application of content knowledge and skills to new situations and sustained tasks. For each Assessment Target in English language arts and mathematics, the depth(s) of knowledge (DOK) that the student needs to bring to the item/task has been identified. Short descriptions of the Cognitive Rigor Matrix for each content area are provided below.

Table 4. A “Snapshot” of the Cognitive Rigor Matrix for Mathematics.

Depth of Thinking (Webb) + Type of Thinking (Revised Bloom)	DOK Level 1 Recall & Reproduction	DOK Level 2 Basic Skills & Concepts	DOK Level 3 Strategic Thinking & Reasoning	DOK Level 4 Extended Thinking
Remember	<ul style="list-style-type: none"> Recall conversions, terms, facts 			
Understand	<ul style="list-style-type: none"> Evaluate an expression Locate points on a grid or number on number line Solve a one-step problem Represent math relationships in words, pictures, or symbols 	<ul style="list-style-type: none"> Specify, explain relationships Make basic inferences or logical predictions from data/observations Use models /diagrams to explain concepts Make and explain estimates 	<ul style="list-style-type: none"> Use concepts to solve non-routine problems Use supporting evidence to justify conjectures, generalize, or connect ideas Explain reasoning when more than one response is possible Explain phenomena in terms of concepts 	<ul style="list-style-type: none"> Relate mathematical concepts to other content areas, other domains Develop generalizations of the results obtained and the strategies used and apply them to new problem situations
Apply	<ul style="list-style-type: none"> Follow simple procedures Calculate, measure, apply a rule (e.g., rounding) Apply algorithm or formula Solve linear equations Make conversions 	<ul style="list-style-type: none"> Select a procedure and perform it Solve routine problem applying multiple concepts or decision points Retrieve information to solve a problem Translate between representations 	<ul style="list-style-type: none"> Design investigation for a specific purpose or research question Use reasoning, planning, and supporting evidence Translate between problem & symbolic notation when not a direct translation 	<ul style="list-style-type: none"> Initiate, design, and conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results
Analyze	<ul style="list-style-type: none"> Retrieve information from a table or graph to answer a question Identify a pattern/trend 	<ul style="list-style-type: none"> Categorize data, figures Organize, order data Select appropriate graph and organize & display data Interpret data from a simple graph Extend a pattern 	<ul style="list-style-type: none"> Compare information within or across data sets or texts Analyze and draw conclusions from data, citing evidence Generalize a pattern Interpret data from complex graph 	<ul style="list-style-type: none"> Analyze multiple sources of evidence or data sets

Evaluate			<ul style="list-style-type: none"> • Cite evidence and develop a logical argument • Compare/ contrast solution methods • Verify reasonableness 	<ul style="list-style-type: none"> • Apply understanding in a novel way, provide argument or justification for the new application
Create	<ul style="list-style-type: none"> • Brainstorm ideas, concepts, problems, or perspectives related to a topic or concept 	<ul style="list-style-type: none"> • Generate conjectures or hypotheses based on observations or prior knowledge and experience 	<ul style="list-style-type: none"> • Develop an alternative solution • Synthesize information within one data set 	<ul style="list-style-type: none"> • Synthesize information across multiple sources or data sets • Design a model to inform and solve a practical or abstract situation

(Hess, Carlock, Jones, & Walkup, 2009)

Table 5. A “Snapshot” of the Cognitive Rigor Matrix for English Language Arts.

Depth of Thinking (Webb) + Type of Thinking (Revised Bloom)	DOK Level 1 Recall & Reproduction	DOK Level 2 Basic Skills & Concepts	DOK Level 3 Strategic Thinking & Reasoning	DOK Level 4 Extended Thinking
Remember	<ul style="list-style-type: none"> • Recall, locate basic facts, definitions, details, events 			
Understand	<ul style="list-style-type: none"> • Select appropriate words for use when intended meaning is clearly evident 	<ul style="list-style-type: none"> • Specify, explain relationships • Summarize • Identify central ideas 	<ul style="list-style-type: none"> • Explain, generalize, or connect ideas using supporting evidence (quote, text evidence, example...) 	<ul style="list-style-type: none"> • Explain how concepts or ideas specifically relate to other content domains or concepts
Apply	<ul style="list-style-type: none"> • Use language structure (pre/suffix) or word relationships (synonym/antonym) to determine meaning 	<ul style="list-style-type: none"> – Use context to identify word meanings • – Obtain and interpret information using text features 	<ul style="list-style-type: none"> • Use concepts to solve non-routine problems 	<ul style="list-style-type: none"> • Devise an approach among many alternatives to research a novel problem
Analyze	<ul style="list-style-type: none"> • Identify the kind of information contained in a graphic, table, visual, etc. 	<ul style="list-style-type: none"> – Compare literary elements, facts, terms, events • – Analyze format, organization, & text structures 	<ul style="list-style-type: none"> • Analyze or interpret author’s craft (e.g., literary devices, viewpoint, or potential bias) to critique a text 	<ul style="list-style-type: none"> • Analyze multiple sources or texts • Analyze complex/ abstract themes
Evaluate			<ul style="list-style-type: none"> • Cite evidence and develop a logical argument for conjectures based on one text or problem 	<ul style="list-style-type: none"> • Evaluate relevancy, accuracy, & completeness of information across texts/ sources

Smarter Balanced General Item Specifications

<p>Create</p>	<ul style="list-style-type: none"> - Brainstorm ideas, concepts, problems, or perspectives related to a topic or concept 	<ul style="list-style-type: none"> -Generate conjectures or hypotheses based on observations or prior knowledge and experience 	<ul style="list-style-type: none"> Develop a complex <i>model</i> for a given situation Develop an alternative solution 	<ul style="list-style-type: none"> Synthesize information across multiple sources or texts -Articulate a new voice, alternate theme, new knowledge or perspective
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(Hess, Carlock, Jones, & Walkup, 2009)

